PUBLIC HEALTH REPORT

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Induced Vivax Malaria Among Users of Intravenous Heroin

IN RECENT YEARS, malaria in California has been limited mainly to importation of disease by servicemen returning from overseas and foreign travelers. The parasites have been largely confined to such persons, spilling into the community only occasionally through blood transfusions. An isolated mosquito-borne outbreak in 1952-53 among 35 Campfire girls was traced to a serviceman who had acquired his infection in Korea. Within the past several months, however, a new pattern of malaria transmission has emerged in two southern California counties among parenteral narcotics users. The purpose of this brief report is to highlight the epidemiologic and public health implications of these outbreaks.

Ventura Outbreak

The first outbreak was recognized in December 1970 when the Ventura County Health Department notified the State Health Department that four cases of malaria had been diagnosed in heroin using residents in a small Ventura County town during the previous four weeks. Subsequent investigations revealed two more related cases. Of the six affected persons, all were male and four were non-veterans who had not been to an endemic malaria area or had blood transfusions. Common to all were a blood smear diagnosis of Plasmodium vivax, and a history of shared heroin and intravenous injection equipment. The two Vietnam veterans had a history of malaria while on active duty, one sixteen months and the other five months previously. The veteran who had had malaria five months previously had not sought medical attention, but was found to have P. vivax on a thin blood smear examination during the course of the epidemiologic investigation. He admitted to intermittent fevers and chills over the previous several months for which, following return to the United States, he sporadically took quinine and Dapsone pills, the remainder of antimalarial medication left over from Vietnam. This veteran was named as a contact by all of the other patients.

Bakersfield Outbreak

In late February 1971, the State Health Department was notified of five cases of P. vivax malaria among male non-veterans which were associated with parenteral narcotics use in the Bakersfield (Kern County) area. Preliminary information indicated that these cases had no known association with the December cluster of induced vivax cases in Ventura County. Review of the Bakersfield cases indicated the probability of an extensive outbreak and an intensive epidemiologic investigation was promptly begun.

A malaria clinic was established in Bakersfield through the combined efforts of the Kern County Health Department, local medical organizations, the Center for Disease Control, Atlanta, Georgia, and the State Health Department. The malaria clinic was established to interview persons suspected of having the disease and all contacts, to obtain thick and thin peripheral blood smears and sera, and to administer presumptive treatment.

Through clinic activities approximately 450 heroin-using contacts were identified, and more than 325 of them received presumptive or "epidemiologic" treatment. Treatment of induced vivax malaria consists of chloroquine tablets, 1.0 gram followed by 0.5 gram six hours later and then 0.5 gram per day for the next two days, for a total dosage of 2.5 grams. Primaquine is not necessary since there is no exo-erythrocytic (tissue) phase with induced P. vivax infection. Only mosquito transmitted P. vivax infection has an exo-erythrocytic stage. All persons in the Bakersfield area who had been sharing parenteral narcotics were considered potentially exposed and epidemiologic treatment of all who had been exposed was given, as in the model of gonorrhea. Primaquine treatment in addition to chloroquine was given only to those persons with a history of military service in Southeast Asia.

The investigation found a total of 45 blood smear-confirmed cases of P. vivax infection plus an additional seven probable cases in which blood smear was negative but the indirect fluorescent antibody test was positive for malaria. The latter seven all had a history of sharing heroin with smear-positive patients. It was mainly young males who were affected; there were only five females and three patients over 30 years of age in the group. All were Caucasian, the majority Mexican-American. The majority of patients used heroin daily and all shared heroin and injection equipment with one or more other patients, the average being eight. Patients became ill between November 1970 and the end of March 1971. Only one became ill after the first week of March, when the clinic was established. As in Ventura County a Vietnam veteran was the apparent source of infection. No link could be established between the Ventura and Bakersfield cases. Only one instance of transmission beyond Bakersfield has been recognized. A Sutter County resident who acquired malaria in Bakersfield subsequently infected a fellow heroin user after his return to Sutter County.

Malaria and Narcotics Use

From 300 to 500 cases of malaria among Vietnam returnees are reported annually in California. Undoubtedly, more cases occur which are either not diagnosed or not reported. The documented, increasing use of heroin by troops in Vietnam and the United States coupled with the occurrence of malaria in this group most likely will give rise to more outbreaks of this type. Malaria can thus be added, along with hepatitis, as another medical symptom of the drug abuse problem in California.

Of the 374 cases of malaria reported in California in 1970 in which a species diagnosis was stated, 82 percent were P. vivax and 13 percent were P. falciparum; P. malariae, P. ovale and mixed infections accounted for the remaining 5 percent. Although P. vivax is the predominant species found in California, P. falciparum with its associated high mortality in non-immune populations would pose a serious danger if it were introduced. During the 1930's induced falciparum malaria in New York City heroin addicts was common. In various studies the mortality rate in this group ranged from 16 to 80 percent. It also was noted that these patients had symptoms not always typical of malaria. The majority of non-comatose patients complained of chills, tremulousness, vague aches and pains, cough, headache and feverishness. Most patients attributed these complaints to drug withdrawal or adulterated drugs. It should be kept in mind that heroin users with "withdrawal symptoms" may be in the early stages of cerebral malaria.

Public Health Significance

At the time of these two outbreaks there were virtually no Anopheles mosquitoes in these areas, and thus the potential for mosquito-transmitted disease was remote. To the best of our knowledge, this is true the year around. However, there are Anopheles mosquitoes in large numbers starting at about the mid-San Joaquin Valley and going north to the northern tip of the Sacramento Valley, and also on the Western edge of the Sierra foothills. In this area, therefore, mosquito transmission of malaria can occur. The considerable effort expended in finding cases and treating as many contacts as possible in Bakersfield may have

been sufficient to control the outbreak. However, since many potentially exposed contacts could not be located for epidemiologic treatment, needle-associated malaria may continue in this population group. Also, as with gonorrhea, it is conceivable that a "ping pong" effect may occur if treated contacts continue to share needles with persons having undetected and untreated malaria since there is little acquired immunity to induced malaria, especially if treated promptly. The mobility of this population and their expanding social circles can promote spread of malaria infection to other locales, such as occurred in Sutter County.

The diagnosis of malaria should be considered in all intravenous drug users with fever and chills. Thick and thin blood smears should be examined on all suspected cases and positive smears forwarded via local health departments to the State Microbial Diseases Laboratory for confirmation. Malaria cases should be reported promptly to local health departments so that necessary investigation can be begun without delay. Presumptive treatment of all needle-sharing contacts is recommended on an epidemiologic basis. Treatment varies according to the species of malarial parasite identified or suspected. Recommended treatment schedules are given in *Control of Communicable Diseases in Man,* 11th Edition, American Public Health Association, 1970.

Unless vigilance to detect possible cases of malaria in drug users is vigorously exercised, malaria may spread through shared needles and syringes and the risk of mosquito transmission may increase in receptive areas as summer approaches.

OCULAR SIGNS OF CAROTID ARTERY DISEASE

"Ophthalmologists have been extremely interested in the signs and symptoms of carotid artery disease and, in particular, the one component which may bring the patient to the eye doctor—the visual disturbance associated with intermittent amaurosis fugax or ipsilateral blindness. . . . Presumably if the carotid artery is partially stenosed, microemboli might leave an area of a plaque, rapidly dissipate through the retina, and lead to transient visual disturbance.

"According to a recent nationwide study by the National Institutes of Health, approximately 50 percent of patients with amaurosis fugax will suffer a major stroke within three years of the initial symptom and/or sign. It therefore behooves the ophthalmologist to utilize any available techniques except angiography to elicit findings indicative of carotid occlusive disease."

—MILES A. GALIN, M.D., New York City

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